an opening 20 therein at the switch site so that the flexible upper support 10 can be moved downwardly to close the switch. The supports 6, 10 may be of polyester or other suitable film and the conductors, including the switch contacts, may be metallized conductors produced by electro-deposition, or they may be screened on conductive inks. In the following description, the surface 16 is referred to as the first surface and the surface 18 as the second surface.

Referring now to FIG. 3, the switch contact means 22 on the surface 16 comprises a first surface central contact 26 and a peripheral contact 28. The peripheral contact is generally circular and surrounds the central contact. First surface circuit conductors 30, 32 extend to the central contact 26 and the peripheral contact 28, respectively. These circuit conductors normally extend to the electrical devices controlled by the switch.

The first surface central contact 26 comprises a main contact bar 34 which extends through the center of the switch site and which merges with the circuit conductor 30. Commoning extensions 36 extend from the main contact bar 34 as branches extending normally of the axis of the main contact bar. Additional commoning extensions 38 extend from the main contact bar adjacent to the ends of the bar 34 and the extensions 38 are somewhat shorter than the extensions 36 for reasons which will become apparent. Additional branches 40 extend laterally from the main contact bar but these branches do not participate in the commoning function carried out by the extensions 36, 38; the extensions 40 are present to insure that the second surface central contact 50 will engage the first surface central contact 26.

The peripheral contact 28 is not a complete circle but has ends 42. A plurality of peripheral contact commoning extensions 44 extend from the peripheral contact inwardly towards the bar 34 of the first surface central contact.

The free ends of the extensions 36, 38 and 44 are adjacent to each other and define a circular shorting zone indicated at 48 by phantom lines in FIG. 3. In the disclosed embodiment, these free ends of the commoning extensions 36, 44 overlap and in any event, the free ends should be sufficiently close to each other to permit them to be electrically connected to each other by a commoning conductor 58 on the surface 18 as will be described below.

The contact means 24 on the second surface 18, that is the lower surface of the second insulating support 10, comprise a second surface central contact 50 and a commoning contact 58 which surrounds the central contact 50. The central contact 50 is circular in form but has an open center through which extend conductors 56. This design is used in order to reduce the amount of ink required for the circle. As explained previously, the extensions 40 on the bar 34 are contacted by the circular portion 50 and the bars 56 of the second surface central contact when the switch is closed.

The commoning conductor 58 is generally circular but is an incomplete circle and the circuit conductor 52 extends from the central conductor through the resulting gap in the commoning conductor 58. The conductor 58 is opposed to and conforms in shape and size to the commoning zone 48 on the surface 16.

In use, when the active area 14 of the cover 12 is pressed, the membrane support 10 is flexed downwardly and the contact means 24 on the surface 18 are brought into engagement with the contact means 22 on the surface 16 so that the second surface circuit conductor 52 is connected to the first surface circuit conductors 30, 32.

If the closing force is applied uniformly to an extensive portion of the areas of active zone 14, the probability is that the contacts 50, 58 on the surface 18 will simultaneously engage the contacts 26, 28 on the surface 16. If simultaneous engagement is achieved, the second surface central contact 50 will contact the first surface central contact 26 and the commoning conductor 58 will move into the commoning zone 48 so that it will extend over the free ends of the extensions 36, 44. The commoning conductor will thus provide a conductive path from the central contact 26 on the first surface to the peripheral contact 28 on the first surface 16.

If, however, a localized closing force is applied to the zone 14 and the closing force is not on the center of the zone, it is possible that the commoning conductor 58 will be moved against, and into contact with, the free ends of the extensions 36, 44 and the central contact 50 on the second surface will not contact the central contact 26 on the first surface 16. If this happens, however, the circuit conductor 52 will not be connected to either of the circuit conductors 30, 32 for the reason that the commoning conductor 58 is electrically isolated from the second surface central contact 50. If the operator does not achieve closure of the switch, it will soon be realized and a more uniform force will be applied to the zone 14. When the additional force is applied, the contact 50 will engage contact 26 and circuit conductor 52 will be connected to circuit conductors 30, 32 simultaneously.

It will be apparent from the foregoing description that it is impossible to connect the circuit conductor 52 to the circuit conductor 32 prior to its being connected to the circuit conductor 30. The only possible non-simultaneous sequence is the connection of the circuit conductor 52 to the circuit conductor 30 followed by connection of the circuit conductor 52 to the circuit conductor 32 while connection to circuit conductor 30 is maintained.

A switch in accordance with the invention can have contacts having shapes significantly different from the shapes of the contacts shown in the drawing and described above. The location of the central and peripheral contacts in the disclosed embodiment is probably the most logical arrangement of contacts in accordance with the invention. However, the main contact on the first surface can simply have shorting or commoning extensions projecting laterally from the center of the switch zone and the second contact on the first surface can simply have commoning extensions inter-digitated with commoning extensions extending from the first contact. The commoning contact on the second surface would, as described above, conform in shape and size to the commoning zone on the first surface and be electrically isolated from the main contact on the second surface to which the second surface circuit conductor extends.

I claim:

1. A membrane switch device of the type comprising first and second parallel spaced-apart insulating supports, the supports having opposed first and second surfaces and having opposed contact means on the opposed surfaces forming an electrical switch means, at least one of the supports being flexible whereby upon movement of the supports towards and against each other until the opposed contacts are against each other,